

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) An apparatus Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:
  - one or more optical fibers or other waveguides for receiving light; and
  - one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more modeled tap structures ~~direct~~ directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light ~~through~~ out of the one or more optical fibers or other waveguides, wherein the one or more modeled tap structures is formed by using pattern parameters determined by modeling the desired illumination pattern.
  
2. (Currently Amended) The commercially produced optical fibers or other waveguides having modeled tap structures apparatus according to claim 1, wherein the illumination pattern is generally spherical in shape.

3. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally in the shape of an arc.
4. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally cylindrical in shape.
5. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the illumination pattern is generally conical in shape.
6. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, further comprising:  
one or more reflective surfaces disposed within the one or more optical fibers or waveguides, wherein the one or more reflective surfaces reflects the light so that the reflected beam of light travels in a direction substantially opposite to the original direction of travel of the light.

7. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures have-has an asymmetrical geometry.

8. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures extend-extends radially in an arc or completely around the one or more optical fibers or waveguides.

9. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures each comprise-comprises a continuous circular tap structure.

10. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures comprises a plurality of modeled tap structures which are arranged in an array extending along a length of the one or more optical fibers or waveguides.

11. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more modeled tap structures each have-has a length extending in a longitudinal direction of the

respective optical fiber or waveguide larger than a width extending in a radial direction of the respective optical fiber or waveguide.

12. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, further comprising:  
one or more light sources that provide provides the light to the one or more optical fibers or waveguides.

13. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources comprise comprises one or more selectively controllable light sources.

14. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 13, wherein the one or more selectively controllable light sources have has varying illumination powers.

15. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources provide provides at least partially coherent light to the one or more optical fibers or waveguides.

16. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources provide provides incoherent light to the one or more optical fibers or waveguides.

17. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources provide provides visible light to the one or more optical fibers or waveguides.

18. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources provide provides UV light to the one or more optical fibers or waveguides.

19. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources provide provides infrared light to the one or more optical fibers or waveguides.

20. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 12, wherein the one or more light sources comprise comprises one or more lasers.

21. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources comprise comprises one or more semiconductor laser diodes.

22. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources comprise comprises one or more high power laser diodes.

23. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 20, wherein the one or more light sources comprise comprises one or more light emitting diodes.

24. (Currently Amended) An apparatus Commercially produced optical fibers or other waveguides having modeled tap structures, comprising:

one or more optical fibers or other waveguides for receiving light; and  
one or more a continuous modeled tap structurestructures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more continuous modeled tap structurestructures directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light throughout of the one or more optical fibers or other waveguides, wherein the one or more continuous tap

~~structure-structures is~~ formed by using pattern parameters determined by modeling the desired illumination pattern.

25. (Currently Amended) ~~An apparatus Commercially produced optical fibers or other waveguides having modeled tap structures,~~ comprising:

one or more optical fibers or ~~other~~ waveguides for receiving light; and  
one or more modeled tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more modeled tap structures ~~direct~~~~directs~~ the light in predetermined directions so as to optimize an amount of the light output ~~through~~~~out of~~ the ~~one or more optical fibers or other waveguides,~~ wherein the one or more modeled tap structures ~~are~~~~is~~ formed by using pattern parameters determined by modeling an illumination pattern configured for optimized light output.

26. (Currently Amended) ~~The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein greater than approximately 90% of the light is output through~~~~out of~~ the one or more ~~tap structures~~ ~~optical fibers or other waveguides.~~

27. (Currently Amended) ~~An apparatus Commercially produced optical fibers or other waveguides having modeled tap structures,~~ comprising:

one or more photon channeling structures for receiving photons; and  
one or more modeled tap structures formed in the one or more photon channeling structures configured so that, when the photons ~~travels~~ travel through said photon channeling structures, the one or more modeled tap structures ~~direct~~ directs the ~~light~~ photons in predetermined directions so as to create a desired pattern by scattering, diffraction, reflection and/or refraction of portions of the photons ~~through~~ out of the one or more photon channeling structures, wherein the one or more modeled tap structures is formed by using pattern parameters determined by modeling the desired pattern.

28. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures accordingly to claim 27, wherein the photons comprise light.

29. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures accordingly to claim 27, wherein the photons comprise incoherent radiation.

Claims 30-35. (Canceled)

36. (Currently Amended) The ~~apparatus~~ commercially produced optical fibers or other waveguides having modeled tap structures according to claim 1, wherein the one or more

modeled tap structures ~~comprise-comprises~~ a plurality of modeled tap structures of a specific shape, depth, and spacing configured by the modeling process to create a desired illumination pattern based on a particular application.

37. (Currently Amended) The ~~apparatus commercially produced optical fibers or other waveguides having modeled tap structures~~ according to claim 25, wherein the one or more modeled tap structures ~~comprise-comprises~~ a plurality of modeled tap structures of a specific shape, depth, and spacing configured by the modeling process to create a desired illumination pattern based on a particular application.

38. (Currently Amended) The ~~apparatus commercially produced optical fibers or other waveguides having modeled tap structures~~ according to claim 1, wherein the tap structures are modeled using an iterative process.

39. (Currently Amended) The ~~apparatus commercially produced optical fibers or other waveguides having modeled tap structures~~ according to claim 1, wherein the tap structures are modeled using a theoretical modeling process.

40. (Currently Amended) The ~~apparatus commercially produced optical fibers or other waveguides having modeled tap structures~~ according to claim 24, wherein the tap ~~structure is-structures are~~ modeled using an iterative process.

41. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 24, wherein the tap structure is-structures are modeled using a theoretical modeling process.

42. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein the tap structures are modeled using a iterative process.

43. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 25, wherein the tap structures are modeled using a theoretical modeling process.

44. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 27, wherein the tap structure structures are modeled using an iterative process.

45. (Currently Amended) The apparatus commercially produced optical fibers or other waveguides having modeled tap structures according to claim 27, wherein the tap structures are modeled using a theoretical modeling process.

46. (New) An apparatus comprising:

one or more optical fibers or other waveguides for receiving light; and

one or more tap structures formed in the one or more optical fibers or waveguides configured so that, when the light travels through said one or more optical fibers or waveguides, the one or more tap structures directs the light in predetermined directions so as to create a desired illumination pattern by scattering, diffraction, reflection and/or refraction of portions of the light through the one or more optical fibers or other waveguides, wherein a majority of the light emitted out of the one or more optical fibers or other waveguides does not exit the one or more optical fibers or other waveguides through the one or more tap structures.

47. (New) The apparatus according to claim 46, wherein the majority of the light emitted through the one or more optical fibers or other waveguides is directed in a direction toward a substantially opposite side of the one or more optical fibers or other waveguides from a portion of the light that passes through the one or more tap structures.

48. (New) The apparatus according to claim 46, wherein the one or more optical fibers or other waveguides comprises one or more optical fibers and the one or more tap structures is formed in the cladding and at least a portion of the core.